SECTION 05100

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Section Includes: The work under this section includes furnishing all labor, materials and equipment, and performing all operations in connection with Structural and Miscellaneous Steel and related items indicated on the Drawings, specified herein or reasonably implied to complete the work.

1. Structural Steel framing members, support members, embed angles, bar joists and struts.
2. Base plates, anchor bolts and structural framing accessories for a complete and proper installation of the work.

B. Related Work: The following related work is described under other sections of these Specifications:

1. Sheet metal ductwork and related items and brackets or supports for mechanical equipment are specified in the section “Air Conditioning”.
2. Metal supports for fixtures and piping are specified in the section “Plumbing”.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section. All welding shall conform to 1996 structural welding code using AWS D1-1 shielded metal arc or flux core welding process utilizing the E70 low hydrogen electrode or matching filler metal.

B. Quality welding processes and welding operators in accordance with AWS “Standard Qualification Procedures.” Conform to AWS Code D1.1-85. Welding Inspection:

1. It shall be the responsibility of the Contractor that the Architect be notified of the commencement of welding, shop or field, in ample time to provide inspection.
2. Installation of Automatic end and welded studs will be inspected by a representative of the Owner. At the beginning or each day’s work, a minimum of two test stud welds shall be made with the equipment to be used to metal, which is the same as the actual work piece. The test studs shall be subjected to a 90 degree bend test by striking them with a hammer. After the above test, the weld section shall not exhibit any tearing out or cracking.
3. Ultrasonic test (UT) to establish existence of interior defects.

C. The American Institute of Steel Construction (AISC) “Manual of Steel Construction” shall apply in the performance of this work, except for clauses contradicted by the General and special Conditions and this section of the specifications.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01000.

B. Product data: Within 35 calendar days after the Contractor has received the Owner’s Notice to Proceed, submit:

1. Producers’ or manufacturers’ specifications and installation recommendations for the following products, including laboratory test reports and other data required to prove compliance with the specified requirements.
   a. Structural steel, including certified copies of mill test reports covering chemical and physical properties;
   b. Unfinished bolts and nuts;
   c. Structural steel primer paint.
2. Shop Drawings including complete details and schedules for fabrication and shop assembly of members. Shop Drawings shall be generally in accordance with AISC “Structural Steel Detailing”.
   a. Include details of cuts, connections, camber, holes, and other pertinent data;
   b. Indicate welds by AWS symbols, and show size, type, and length of weld;
   c. Provide setting drawings, templates, and directions for installing anchor bolts and other required anchors;
   d. Identify details by reference to sheet and detail number of the Drawings.

1.04 PRODUCT HANDLING

A. All material shall be handled, shipped, and stored in a manner that will prevent distortion or other damage. Material shall be stored off of the ground, in a clean location and kept properly drained. All damaged material shall be replaced or repaired as directed by the architect.

B. Delivery and storage:
1. Delivery materials to the job site properly marked to identify the location for which they are intended.
2. Use markings corresponding to markings shown on the approved Shop Drawings.
3. Store in a manner to maintain identification and to prevent damage.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Rolled steel plates and bars: Comply with ASTM A36.
1. Girder and beam sections and beam cover plates.
2. All other bars, plates and shapes.

B. Steel Tube: Comply with ASTM A500, grade B. 46 ksi.
Steel Pipe: Comply with ASTM A53 grade B.

C. Anchor bolts: Comply with ASTM A307, non-headed type with double hexagonal nuts unless otherwise indicated.

D. Unfinished threaded fasteners:
1. Comply with ASTM A307, grade A, regular low carbon steel bolts and nuts.
2. Provide either hexagonal or square heads and nuts; except use only hexagonal units for exposed connections.
3. High strength bolts: ASTM A-325N.

E. Primer: Use “10-99 Tnemec Primer,” or equal approved in advance by the Architect.

F. Anchor bolt templates: Provide separate steel templates not less than 10 gage for each anchor bolt group or assembly.

G. Electrodes for welding: Comply with AWS Code, using AWS A5.17 or A5.23 E70 low-hydrogen electrodes or matching filler metal as required for intended use.

H. Resistance welded studs shall be as manufactured by Nelson Stud Welding Division of Gregory Industries or by KSM Products, Inc.

2.02 FABRICATION

A. Shop fabrication and assembly:
1. Fabricate items of structural steel in accordance with AISC specifications; “Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings”, latest edition, and as indicated on the approved Shop Drawings.
2. Properly mark and match-mark materials for field assembly and for identifications as to location for which intended.
3. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
4. Where finishing is required, complete the assembly, including welding of units, before start of finishing operations.
5. Provide finish surfaces of members exposed in the final structure free from markings, burrs, and other defects.

B. Connections:
1. Provide bolts and washers of types and sizes required for completion of field erection.
2. Welded construction: Comply with AWS Code for procedures, appearance, and quality of welds, and methods used in correcting welded work.
3. Assemble and weld built-up sections by methods, which will produce true alignment of axes without warp.

C. Welding shall be done by AWS qualified operators, certified by an approved testing lab. The operator, the welding equipment, the electrodes, the methods of making the welds, and all structural

welds, as completed, shall be as approved by the representative of the approved Testing Laboratory.

D. Resistance welded studs shall be installed with special approved welding equipment, in accordance with stud manufacturer's recommendations.

E. Anchors. Welding rod for welded bar anchors shall be E 70 Series low hydrogen.

F. Exposed Welds. Welds which will be exposed to view, after building is completed, shall be neatly dressed off smooth, flush with the parent metal.

G. Holes for other work:
   1. Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on the approved Shop Drawings.
   2. Provide threaded nuts welded to framing, and other specialty items as shown, to receive other work.
   3. Cut, drill, or punch holes perpendicular to metal surfaces.
   4. Do not flame cut holes or enlarge holes by burning.
   5. Drill holes in bearing plates.

2.03 SHOP PAINTING

A. General:
   1. Shop paint structural steel work, except those members or portions of members to be embedded in concrete or mortar.
   2. Paint embedded steel, which is partially exposed on the exposed portions, and the initial 2" of embedded areas only.
   3. Do not paint surfaces, which are to be welded or high-strength bolted with friction type connections.
   4. Apply two coats of paint to surfaces, which are inaccessible after assembly or erection. Change color of the second coat to distinguish it from the first.

B. Surface preparation:
   1. After inspection and before shipping, clean steel work to be painted.
   2. Remove loose rust, loose mill scale, and spatter, slag, and flux deposits.
   3. Clean steel in accordance with Steel Structures Painting Council SP-3k, "Power Tool Cleaning."

C. Painting:
   1. Immediately after surface preparation, apply structural steel primer paint in accordance with the manufacturer's recommendations and at a rate to provide a uniform dry film thickness.
   2. Use painting methods, which will result in full coverage of joints, corners, edges and exposed surfaces.

2.04 GALVANIZING

A. All steel and ferrous metal items located on the exterior of the building, or otherwise specifically shown or noted on drawings to be galvanized, shall be galvanized by the hot-dip process, conforming to ASTM A123-68a. All required hot-dip galvanizing shall be done after fabrication, in the largest sections possible. Items too large for available dip tanks or as requested in writing shall be sprayed, by approved methods, with molten zinc to coating thickness of .003” to .004”.

B. Weight of the zinc coating per square foot of actual surface shall average not less than 2.0 ounces and no individual specimen shall show less than 1.8 ounces. The thickness of the zinc coating shall be the normal coating to be obtained by immersion in a bath of molten zinc at a temperature of not more than 865 degrees F., and allowed to remain until the temperature of the work being galvanized becomes the same as the bath.

C. All shop galvanized metal work necessitating field soldering or welding which in any manner removes original galvanizing shall be restored by field cold galvanizing with “Galvaloy,” “Galvicon,” or “Dryalv.”

D. After fabrication, work indicated on the Drawings to be galvanized shall be thoroughly cleaned in a pressure spray of hot alkali solution to remove all oil, grease and dirt, then rinsed in hot water. Work shall then be hot-dip galvanized. Finish work shall be free from twist, bow, warp and excess spelter.

E. Spelter. The slab zinc (spelter) used shall conform to the standard specification for slab zinc of the American Society for Testing Materials.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. All work shall be executed and finished in accordance with approved shop drawings, and to conform with the best practice required to produce the highest grade construction. Workmanship shall be equal to the best practice in modern structural shops. Portions of work exposed to view shall be finished neatly. Welds shall be neat and uniform.

B. Construction. Type I and Type II, in accordance with Section 1 of the AISC “Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings”.

C. Substitution of sections or modifications of details, or both, shall not be made without written approval of the architect.

D. Furnish and deliver anchor bolts, inserts, plates and other incidental items of structural steel required to be built into concrete with instructions or templates for their installation, to respective trades at the proper time to avoid delay in work.

E. Report any errors in shop fabrication or deformation resulting from handling and transportation that prevent proper assembly and fitting of parts immediately to Architect and obtain approval of method of correction. Approved corrections shall be made at no additional cost to the Owner.

3.03 ERECTION

A. Comply with AISC specifications and “Code of Standard Practice,” except as may be modified herein.

B. Anchor bolts:
   1. Provide anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
   2. Provide templates and other devices necessary for pre-setting bolts and anchors to accurate locations.

C. Bases and bearing plates: Shop weld to columns and members attached to concrete.

D. Splicing:
   1. Splice members only where indicated unless, with the Architect’s approval, splices not indicated would result in lower costs due to reduced shipping expense.
   2. For splices not indicated, submit structural calculations prepared and signed by a structural engineer licensed to practice where the fabricator is located.

E. Gas cutting:
   1. Do not use gas cutting torches for correcting fabricating errors in the structural framing.
   2. Cutting will be permitted only in secondary members as acceptable to the Structural Engineer.
   3. When gas cutting is permitted, finish the gas cut section to a sheared appearance acceptable to the Structural Engineer.

F. Surveys:
   1. Establish permanent benchmarks necessary for accurate erection of structural steel.
   2. Check elevations of concrete surfaces, and locations of anchor bolts and similar items, before erection proceeds.

G. Temporary shoring and bracing:
   1. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads.
   2. Provide temporary guy lines to achieve proper alignments of the structure as erection proceeds.
   3. Remove temporary connections and members when permanent members are in place and the final connections have been made.

H. Setting bases and bearing plates:
   1. Clean concrete bearing surfaces free from bond-reducing materials, and then roughen to improve bond to the surface by either sandblasting or water-blasting.
   2. Clean the bottom surface of base and bearing plates.
   3. Set loose and attached base plates and bearing plates for structural members in wedges or other adjusting devices.
   4. Tighten anchor bolts after the supported members have been positioned and plumbed.
   5. Do not remove wedges or shim but, if protruding, cut off flush with the edge of the base of bearing plate prior to packing with grout.
   6. Pack grout solidly between bearing surfaces and bases or plates to assure that no voids remain.
   7. Finish exposed surfaces, protect installed materials, and allow to cure in strict compliance with the manufacturer’s recommendations as approved by the Architect.

I. Field Assembly:
   1. Set structural frames accurately to the lines and elevations indicated.
   2. Align and adjust members forming part of a complete frame or structure before fastening permanently.
   3. Clean the bearing surface and other surfaces, which will be in permanent contact, before assembly.
   4. Adjust as required to compensate for discrepancies in elevation and alignment.
   5. Level and plumb individual members of the structure within specified AISC tolerances.
   6. Establish required leveling and plumbing measurements on the mean operating temperature of the structure, making allowance for the difference between temperature at time of erection and the mean temperature at which the structure will be when completed and in service.
   7. Comply with AISC specifications for bearing, adequacy of temporary connections, alignment, and the removal of paint on surfaces adjacent to welds.
   8. Bolted connection shown on the Drawings, except as specified otherwise, are for unfinished bolts. Holes for same shall be punched or drilled 1/16 larger than the diameter of the bolt, except as called for otherwise on the drawings.
   9. Bolting of end under connections and girder splices shall be with turned bolts in reamed holes or with torqued high-strength bolts.

3.04 TESTING AND INSPECTING (Conform to California Building Code 1995)

A. Testing:
   1. The Owner's selected testing laboratory will pick up specimens and make required tests.
   2. Cost of procuring test specimens at locations more than 50 miles from the job site will be paid by the Owner and back-charged to the Contractor.
   3. Costs of tests of identified stock will be paid by the Owner; except that if a test fails to comply with the specified requirements, the cost of testing will be paid by the Owner and back-charged to the Contractor.
   4. Costs of tests of unidentified stock will be paid by the Owner and back-charged to the Contractor.

B. Identification and tests:
   1. Structural steel identified by heat or melt numbers, and accompanied by mill analysis and test reports, does not require additional testing.
   2. If structural steel cannot be identified, or if its source is questionable, not less than one tension test and one bend test will be made for each five tons or fractional part thereof.

C. Inspecting:
   1. If, after fabrication and inspection, the work of this Section is found to be defective and to require re-inspection, cost of such re-inspection will be paid by the Owner and back-charged to the Contractor.
   2. Provide labor, equipment, and facilities needed to move and handle the materials to be inspected.
   3. Provide continuous field inspection for all in field welds and tightening of high strength bolts.

D. Welding inspections:
   1. Unless otherwise specified, perform welding under observation of a qualified inspector from a testing laboratory.
   2. Inspect every layer of weld for quality, penetration, and conformity with design requirements.
   3. Require the welding inspector to submit a signed report to the Architect, verifying that:
      a. The welding is adequate and was performed in conformity with the specified requirements; and
      b. Adequate methods have been used to determine the quality of the welding.
   4. Cost of welding inspection will be paid by the Owner. Any re-inspections required due to improper installation shall be paid for by the Contractor.

E. Access:
   1. Provide access for the testing agencies and inspectors to places where structural steel work is being fabricated or produced, so that required testing and inspecting may be accomplished.

F. Erection inspecting:
   1. The Owner's testing and inspecting agency will visually inspect field welded connections, will perform such additional tests and inspections of field work as are required by the Structural Engineer, and will prepare test reports for the Architect's review.
   2. The testing agency will conduct and interpret the tests, and will state in each report whether the inspected work complies with the requirements, specifically stating all deviations therefrom.

G. Corrections:
   1. Correct deficiencies in structural steel work, which inspections and test reports indicate to be not in compliance with the specified requirements.
   2. Perform additional tests required to reconfirm non-compliance of the original work and to show compliance of corrected work, all at no additional cost to the Owner.

3.05 FIELD PAINTING

A. General
   1. Prepare surfaces in a manner appropriate to the condition, and as approved by the Architect.
   2. Clean spots and surfaces where primer coats have been removed, damaged, or burned off, and clean field bolts and other field connections not concealed in the finished work.
   3. Remove dirt, oil, and grease.
   4. Apply a spot coat of the approved primer.
   5. Do not apply paint to wet, damp, oil, or improperly prepared surfaces.

B. Notify the Architect when the work of this Section is ready to receive field painting.
   1. Secure inspection and approval by the Architect prior to field painting.
   2. Using spray or brush, as recommended by the manufacturer of the approved paint material, fill all joints and corners and cover the surfaces with a smooth unbroken film of at least 1.5 dry mils thickness.

END OF SECTION

SECTION 05300

STEEL ROOF DECK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Steel roof deck and accessories.

B. Formed steel closures and accessories for a complete and proper installation.

C. Framing for openings up to and including 18 inches.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 05100 - Structural Steel: Installation of anchors for bearing plates and angles cast in concrete.

1.03 RELATED SECTIONS

A. Section 03300 – Cast-in Place Concrete: concrete fill on metal deck.

B. Section 04340 – Concrete Block Masonry: CMU walls for supports.

C. Section 05100 - Structural Steel: Structural framed openings larger than 18 inches.

D. Section 07500 – Membrane Roofing: Insulation.

1.04 REFERENCES

A. ASTM A36 - Structural Steel.

B. ASTM A446 - Steel Sheet, Zinc-Coated Galvanized by the Hot-Dip Process, Structural Physical Quality.

C. ASTM A525 - Steel Sheet, Zinc-Coated, Galvanized by the Hot-Dip Process.

D. AWS D1.1 - Structural Welding Code.

E. SDI - Design Manual for Composite Decks, Form Decks, Roof Decks.

1.05 SUBMITTALS

A. Shop Drawings: Indicate decking plan, support locations, projections, openings, pertinent details, and accessories. Indicate temporary shoring of decking where required.

B. Product Data: Provide deck profile characteristics and dimensions, structural properties and finishes.

1.06 QUALIFICATIONS

A. Installer Company specializing in performing the work of this Section, approved by manufacture.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store decking on dry wood sleepers; slope for positive drainage.

1.08 FIELD MEASUREMENTS

A. Verify that field measurements are as shown on Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Sheet Steel: ASTM A446, Grade A; with G90 galvanized coating conforming to ASTM A525.

B. Bearing Plates and Angles: ASTM A36 steel, unfinished.

C. Welding Materials: AWS D1.1.

D. Touch-Up Primer: Zinc chromate type.

2.02 ACCESSORIES

A. Flute Closures: Closed cell foam rubber, one inch thick, profiled to fit tight to the decking.

2.03 FABRICATION

A. Metal Decking: Sheet steel per ASTM A446 with zinc coating per ASTM A525 G60 and configured as follows:

SEE CHART NEXT PAGE

Span Design:	Minimum 3 span unless noted otherwise on Drawings.
Minimum Metal Thickness (Excluding Finish):	18 gage unless noted otherwise.
Nominal Height:	1-1/2 inch, fluted profile
Formed sheet Width:	36 inch
Side Joints:	As required to develop shear capacity.
Flute Sides:	Plain vertical face.

B. Metal Closure Strips, Cover Plates, and Related Accessories: 18 gage galvanized sheet steel; of profile and size required.

C. Fabricate roof sump pan of 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

D. Weld Washers: Mild steel, uncoated, ¾ inch outside diameter, 1/8 inch thick.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means installer accepts existing conditions.

3.02 INSTALLATION

A. Erect meal decking in accordance with SDI Design Manual for Composite decks, Form Decks, Roof Decks.

B. Bear decking on steel supports with 2 inch minimum bearing. Align and level.

C. Fasten deck to steel support members at ends and intermediate supports with fusion welds through weld washers at 12 inches oc maximum, parallel with the deck flute and at every other transverse flute.

D. Weld in accordance with AWS D1.1

E. Weld male/female side laps at 18 inches oc maximum.

F. Reinforce steel deck openings per Structural Drawings.

G. Install 6 inch minimum wide sheet steel cover plates, of same thickness as decking, where deck changes direction. Mechanically attach 12 inches oc maximum.

H. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.

I. Install single row of foam flute closures above walls and partitions perpendicular to deck flutes.

J. Position roof sump pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

K. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up prime paint.

3.03 CUTTING AND FITTING

A. Any cutting and fitting in decking for openings shown on Drawings or required by other trades shall be square, trim, equal to factory cutting, and reinforced to maintain structural strength of decking.

3.04 CLEAN-UP

A. After erection, clean all surfaces and leave free of grime and dirt. Remove unused materials, tools, scaffolding and debris from premises and leave broom clean.

END OF SECTION

SECTION 05500

MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Miscellaneous metals consist of all materials 10 gauge and thicker. Include all metal items not specifically described in other Sections of these specifications, but required for a complete and operable facility.

1.02 RELATED SECTIONS

A. Section 03200 - Concrete Reinforcement:

B. Section 05100 - Structural Steel:

C. Section 05300 - Metal Decking:

D. Section 06100 - Carpentry: Rough hardware for carpentry.

E. Section 09110 - Metal Stud Framing: Steel studs.

F. Section 09900 - Painting: Finish.

1.03 QUALITY ASSURANCE

A. Qualifications of welders: Use only certified welders and the shielded arc process for all welding performed in connection with the work of this Section. All welding to conform to American Welding Society Structural Welding Code D1.1.

B. Codes and standards: In addition to complying with all pertinent codes and regulations, comply with:
   1. "Specification for Design, Fabrication, and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction, current edition.

C. Conflicting requirements: In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or these Specifications, the provisions of the more stringent shall govern.

1.04 SUBMITTALS

A. Shop drawings:
   1. Before any miscellaneous metal is delivered to the job site, submit Shop Drawings to the Architect for review.
   2. Show all locations, markings, quantities, materials, sizes, and

shapes and indicate all methods of connecting, anchoring, fastening, bracing, and attaching to the work of other trades.

PART 2 - PRODUCTS

2.01 GENERAL

A. All metal items shall be of the best commercial quality, suitable for the purposes specified, free from rust or other defects impairing strength, durability or appearance.

2.02 STEEL PLATE AND SHAPES

A. Conform with ASTM A36-77a, mild grade.

2.03 STEEL PIPE

A. Conform with ASTM A53-77a, Grade B.

2.04 STEEL TUBING

A. Conform with ASTM A501-76.

2.05 NUTS AND BOLTS

A. Conform with ASTM A307-76b.

2.06 PRIMER PAINT

A. Primer paint shall be compatible with the finish coats specified in Section 09900 of these Specifications except that, where no finish coats are required, primer paint shall be Tnemec 99R, a primer meeting with the requirements of Federal Specification TT-P-615(d), type 1, or an equal approved in advance by the Architect.

2.07 DETAILED REQUIREMENTS FOR SPECIFIC ITEMS.

A. O'Keefe's brand security door (SD): Verify size of existing ladder in field and extend to within 2" of wall.

B. Bolts for attachment of existing ladder and bike rack in new locations. ½" diameter with 3" minimum embedment.

2.08 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of miscellaneous metal, shall be new, free from rust, best quality of their respective kinds, and subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 PREPARATION

A. Field measurements:
   1. Make all required measurements in the field to ensure proper and adequate fit of miscellaneous metal items.
   2. Verify that miscellaneous metal may be fabricated and installed in strict accordance with the original design and the approved Shop Drawings.

3.02 FABRICATION

A. Compliance: Fabricate all miscellaneous metal in strict accordance with the approved Shop Drawings and the referenced standards.

B. Prefabricating: Insofar as possible, shop prefabricate all items complete and ready for installation.

C. Welding:
   1. Unless otherwise indicated on the Drawings, weld all shop connections.
   2. Make all joints and intersections of metal tightly fitting and securely fastened.
   3. Grind all exposed welds smooth.
   4. Make all work square, plumb, straight, and true.

D. Holes:
   1. Drill or punch all holes required for the attachment of work of other trades and for bolted connections.
   2. Burned holes are not acceptable.

3.03 FINISH

A. Remove all loose mill scale, rust spots, flux deposits, oil, dirt, or other matter.

B. Paint with specified primer except where encased in concrete or where surfaces are to be field welded.

C. Galvanize all steel items exposed to the weather and all other steel items as indicated on the drawings. Hot dip galvanize these items after fabrication. Touch-up field welding and adjacent burned areas with Metalloy Products Company's "Galvalloy," Stanley "Zinc Rich," or approved equal.

D. Certain items of miscellaneous steel or other metals may be shown on the drawings in specific finishes such as plated or chromed. In these cases, these specific finishes are required and shall be supplied.

3.04 ERECTION

A. Coordination: Coordinate installation schedule with the schedules of other trades to ensure orderly and timely progress of the total work.

B. Compliance: Erect and install all miscellaneous metal in strict accordance with the Drawings, the approved Shop Drawings, and the referenced standards, aligning straight, plumb, and level within a tolerance of one in 1000.

C. Touching-Up: After the erection and installation are complete, touch-up all shop priming coats damaged during transportation and erection, using the priming paint specified for shop priming. Also touch-up finish on existing items where relocation had resulted in damaged finishes.

END OF SECTION

SECTION 05522

STEEL PIPE HANDRAILS AND RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Steel pipe handrails, balusters, and fittings.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 03300 - Cast-In-Place Concrete: Placement of anchors in concrete.

B. Section 04340 - Unit Masonry System: Placement of anchors in masonry.

1.03 RELATED SECTIONS

A. Section 03200 – Concrete reinforcement: embedment of anchors.

B. Section 09900 - Painting: Paint finish.

1.04 REFERENCE STANDARDS

A. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless Pipe.

B. ASTM A386 - Zinc-Coating (Hot-Dip) on Assembled Steel Products.

C. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

D. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

E. SSPC - Steel Structures Painting Council.

1.05 DESIGN REQUIREMENTS

A. Railing assembly, wall rails, and attachments to resist lateral force of 50 pounds per linear foot or 250 pounds at any point without damage or permanent set.

1.06 SUBMITTALS

A. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

B. Samples: Submit three, six inch long samples of handrail showing Tee] and end stop.

1.07 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings and as instructed by the manufacturer.

PART 2 - PRODUCTS

2.01 STEEL RAILING MATERIALS

A. Steel Tubing: ASTM A500, Grade B.

B. Steel tubing: ASTM A501.

C. Pipe: ASTM A53, Grade A, Schedule 40.

2.02 STEEL RAILING SYSTEM

A. Rails and Posts:
   1. Rails: 1-1/4 inch nominal diameter steel pipe. Handrails must be uninterrupted by posts or brackets. Welded joints.
   2. Posts:
      a. 2 inch nominal diameter steel pipe for guardrail (42 inches) posts. No welds in the length of the post.
      b. 1-1/4 inch nominal diameter steel pipe for handrail (34 inches). No welds in the length of the post.

B. Fittings: Elbows, T-shapes, wall brackets, escutcheons; cast or mandrel formed steel.

C. Mounting: Adjustable brackets and flanges, with steel inserts for casting in concrete with steel brackets for embedding in masonry. Prepare backing plate for mounting in masonry wall construction.

D. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

E. Splice Connectors: Steel welding collars.

F. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

G. Galvanizing: 2.0 ounces per square foot zinc coating in accordance with ASTM A386. Galvanized after fabrication.

H. Shop Pre-finishing: Epoxy primer with urethane topcoat.

2.03 FABRICATION

A. Fit and shop assemble components in largest practical sizes, for delivery to site.

B. Fabricate components with joints tightly fitted and secured.

C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

E. Continuously seal joined pieces by continuous welds.

F. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

G. Accurately form components to suit stairs and landings, to each other and to building structure.

H. Galvanize after fabrication.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete, embedded in masonry, or placed in partitions with setting templates, to expedite the construction schedule.

3.03 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.

B. Provide anchors, required for connecting railings to structure. Anchor railing to structure.

C. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

D. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.

3.04 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.05 SCHEDULE

A. Provide handrail at top of landing and both sides of ramp exiting form door 124b.

END OF SECTION

SECTION 05805

EXPANSION JOINT ASSEMBLIES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Expansion joint assemblies for floor, wall and ceiling surfaces including acoustical ceilings where new construction ties into existing.

B. Refer to Schedule of items at end of Section.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 03100 - Concrete Formwork: Placement of joint assembly frames in formwork.

B. Section 04340 - Concrete Block Masonry: Placement of joint assembly frames in masonry.

1.03 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete: Expansion and contraction joints in exterior concrete paving joints and junction of concrete slab-on-grade and perimeter walls.

B. Section 07600 - Flashing and Sheet Metal: Roof control joints.

C. Section 07900 - Joint Sealers: Expansion and control joint finishing utilizing a sealant and bond breaker.

D. Section 09221 - Lathing and Plastering: Control and expansion accessories to be embedded in plaster.

1.04 REFERENCES

A. ANSI/ASTM B221 - Aluminum-Alloy, Extruded Bar, Rod, Wire, Shape, and Tube.

B. ANSI/ASTM B308 - Aluminum-Alloy, Standard Structural Shapes, Rolled or Extruded.

C. ANSI/ASTM B445 - Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes.

1.05 SUBMITTALS

A. Product Data: Provide joint assembly profiles, dimensions, locations in the Work, affected adjacent construction, anchorage devices, available colors and finish, and locations of splices.

B. Manufacturer's Installation Instructions: Indicate rough-in sizes. Provide templates for cast-in or placed frames or anchors, and indicate tolerances for item placement.

C. Submit two samples illustrating profile, dimension, color, and finish selected.

1.06 FIELD MEASUREMENTS

A. Verify that field measurements are as instructed by the manufacturer.

1.07 EXTRA MATERIALS

A. Provide 10’-0” ft of resilient joint filler, and special tools required for servicing components.

PART II - PRODUCTS

2.01 MATERIALS

A. Provide pre-manufactured expansion joint coverrs as per schedlu from Architectural Art Mfg., Inc. (316-838-8502) or approved equal.

B. Resilient Filler: Neoprene; exhibiting Shore 'A' hardness of [40 - 50] Durometer.

C. Backing Paint: Asphaltic type.

2.02 FABRICATION

A. Joint Covers: Aluminum cover plate, aluminum frame construction, retainers with resilient filler strip, designed to permit plus or minus 50 percent joint movement with full recovery, flush and recess mounted; refer to Schedule.

B. Back paint components in contact with cementitious materials.

C. Galvanize embedded ferrous metal anchors and fastening devices.

D. Shop assemble components and package with anchors and fittings.

E. Provide joint components in single length wherever practical. Minimize site splicing.

2.03 FINISHES

A. Floors: Clear anodized aluminum with etched finish.

B. Walls and Ceilings: Clear anodized aluminum with satin finish.

C. Resilient Filler Exposed to View:
1. Floor: Gray or black
2. Walls: White or beige
3. Ceilings: White

PART III - EXECUTION

3.01 EXAMINATION

A. Verify that joint preparation and affected dimensions are acceptable and meet all details of manufacturer's instructions.

3.02 PREPARATION

A. Provide anchoring devices for installation and embedment.

B. Provide templates and rough-in measurements.

3.03 INSTALLATION

A. Install components and accessories in accordance with manufacturer's instructions.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor components to substrate to prevent misalignment.

D. Seal, fill or level adjacent surfaces so that joint is exactly flush to adjacent flooring and fits to walls and ceiling without shadow lines.

3.04 PROTECTION OF FINISHED WORK

A. Do not permit traffic over unprotected floor joint surfaces.

B. Provide removable strippable coating to protect finish surface. Remove just prior to final cleaning.

3.05 SCHEDULES

A. Floor Joints at new to old slab in corridors and doorways:
   1. Model #C20-13-54 for floor to floor applications
   2. Model #C20-34-54 at floor to wall applications

B. Wall Joints at Masonry or Concrete Walls; Surface Mounted:
   1. Model L20-82-11 at exterior CMU wall to existing wood framed plastered wall
   2. Model G20-62-14 at interior furred CMU wall to existing concrete column.

C. Roof Joints at existing framed wall at dining wall:
   1. Model T20-91-78 at roof to wall.

END OF SECTION